bracket 977 will also rotate counter-clockwise over a limited arc to engage the MTU 160 and advance it through the luminometer 950, as the lead screw 974 rotates.

After the MTU 160 has passed the PMT 956, that MTU is ejected from the luminometer 950 and the next MTU can be pulled through the luminometer 950. The MTU bracket 977 moves toward the MTU entrance end of the MTU transport path by clockwise rotation of the lead screw 974. System friction will cause the screw follower 976 and MTU bracket 977 to rotate clockwise until the guide rod 980 contacts the right-side of guide opening 979, after which, continued rotation of the lead screw 974 will cause the screw follower 976 and the MTU bracket 977 to retreat along the lead screw 974. This clockwise movement of the MTU bracket 977 will cause the arms 981 to rotate clockwise over a limited arc to disengage from the MTU, so the MTU bracket 977 can retreat without contacting the MTU. That is, the arms 981 will pass over the top of the MTU as the MTU bracket 977 retreats

As shown in FIGURE 41, a blinder 982, driven by a blinder actuator 993, moves vertically up and down, in alignment with the aperture 953. Blinder 982 includes a front panel 983 which is mounted for sliding movement with respect to the aperture box 958 and which includes a generally rectangular opening (not shown) formed therein which can be aligned with the aperture 953. A top portion of the front panel 983 blocks the aperture 953 when the opening formed in panel 983 is not aligned with the aperture 953 and thus operates as a shutter for the aperture 953. The blinder 982 includes two side-walls 987, arranged in parallel on opposite sides of the opening and generally perpendicular to the front panel 983, and a back wall 988 spanning the back edges of the sidewalls 987 opposite the front wall 983 and generally parallel to the front wall 983. The side-walls 987 and the back wall 988 define a partial rectangular enclosure sized to accommodate one receptacle vessel 162 of the MTU 160 when the blinder 982 is moved up beneath one of the receptacle vessels 162 of an MTU 160 by the blinder actuator 993. Blinder actuator 993 may be a linear stepper actuator including a stepper motor 992 and a lead screw 994. HSI linear stepper actuators, available from Haydon Switch and Instrument, Inc. of Waterbury, Connecticut have been used.

After the MTU 160 is placed into the luminometer 950 by the right-side transport mechanism 500, the motor 972 is energized to pull the first receptacle vessel of the MTU into alignment with the aperture 953. The blinder 982, which is normally stowed out of the MTU transport path, is raised by the blinder actuator 993 until the side walls 987 and back wall 988 of the blinder 982 surround the receptacle vessel 162 and the opening formed in the front panel 983

of the blinder 982 is aligned with the aperture 953. The blinder 982 substantially prevents light from sources other than the receptacle vessel 162 in front of the aperture 953 from reaching the aperture 953, so that the PMT 956 detects only light emissions from the receptacle vessel directly in front of the aperture 953.

With the PMT shutter open, different detecting reagents (Detect I and Detect II), drawn from containers 1146, 1170 of the lower chassis 1100, are sequentially delivered into the aligned receptacle vessel 162 through dedicated delivery lines (not shown) extending to a reagent port 984 at the top of the luminometer 950. The Detect I and Detect II reagents are hydrogen peroxide-containing and sodium hydroxide-containing reagents, respectively, and combine to form a basic hydrogen peroxide solution which enhances the chemiluminescence of acridinium ester label which has not been hydrolyzed. Because basic hydrogen peroxide is unstable, the Detect I and Detect II reagents are preferably combined in the receptacle tube 162 just prior to detection in the luminometer 950.

After the addition of Detect II, the light emitted from the contents of the receptacle vessel 162 is detected using the PMT 956 and the PMT shutter is then closed. The PMT 956 converts light emitted by chemiluminescent labels into electrical signals processed by the electronics unit and thereafter sent to the controller 1000 or other peripheral unit via cables (not shown) linked to a connector 986.

In cases where less sensitivity is required, it may be possible to use an optical sensor in place of a photomultiplier tube. A diode is an example of an acceptable optical sensor which can be used with the luminometer 950. An optical sensor may also be appropriate when the material of the MTU 160 is relatively transparent, rather than the translucent appearance of the preferred polypropylene material. When selecting a material for the MTU 160, care should be taken to avoid materials that naturally luminesce or are predisposed to electrostatic build-up, either of which can increase the chances of a false positive or interfering with quantification measurements.

The above-described process is repeated for each receptacle vessel 162 of the MTU 160. After the chemiluminescent signal from each receptacle vessel 162 of the MTU 160 has been measured, the motor 972 advances to move the MTU 160 through the exit door 961 and out of the luminometer 950 and into the amplicon deactivation station 750.

An alternate, and presently preferred, luminometer is generally designated by reference number 1360 in FIGURE 43. Luminometer 1360 includes a housing 1372 having a bottom wall

1370, door assemblies 1200 on opposite sides of the bottom wall 1370 which define end portions of the housing 1372, an optical sensor shutter assembly 1250 which defines a front wall of the housing 1370, a top wall (not shown), and a back wall (not shown), which complete the housing 1370 and define an enclosure therein. The right-side door assembly 1200 defines a receptacle entrance opening 1374, and the left-side door assembly 1200 defines a receptacle exit opening 1376 through which a MTU 160 can be passed into and out of the housing 1370. Each door assembly 1200 controls access through the respective opening 1374 or 1376 and comprises an end wall 1202, a cover plate 1232, and a rotating door 1220 rotatably disposed between the end wall 1202 and the cover plate 1232. The optical sensor aperture shutter assembly 1250 controls light entering an optical sensor (not shown in FIGURE 43), for example a photomultiplier tube. Luminometer 1360 includes a light receiver mounting wall 1250 and a cover plate 1290 having an aperture 1292 formed therein.

A bar code scanner 1368 is attached to a front portion of the housing 1372 for scanning MTUs prior to their entry to the luminometer 1360.

A receptacle transport assembly 1332 moves a receptacle (e.g., a MTU 160) through the luminometer 1360 from the entrance opening 1374 to the exit opening 1376. The assembly 1332 includes a transport 1342 movably carried on a threaded lead screw 1340 that is rotated by a motor 1336 coupled to the lead screw 1340 by a belt (not shown).

A dispensing nozzle 1362 is attached in the top wall (not shown) and is connected by conduit tubes 1364 and 1366 to a pump and ultimately to bottles 1146 and 1170 in the lower chassis 1100. Nozzle 1362 dispenses the "Detect I" and the "Detect II" reagents into the receptacles 162 of the MTU 160 within the housing 1372.

A receptacle vessel positioner assembly 1300 is disposed within the housing 1372 and is constructed and arranged to position each tube 162 of the MTU 160 in front of the aperture 1292 and to optically isolate each tube being positioned from adjacent tubes, so that only light from one tube at a time enters the aperture 1292. The positioner assembly 1300 comprises a receptacle positioner 1304 rotatably mounted within a positioner frame 1302 that is secured to the floor 1370 of the housing 1372.

The door assembly 1200 for the MTU entrance opening 1374 and exit opening 1376 of the luminometer 1360 is shown in FIGURE 44. Door assembly 1200 includes a luminometer end-wall 1202 which forms an end wall of the luminometer housing 1372. End-wall 1202 includes a first recessed area 1206 with a second, circular recessed area 1208 superimposed on